

GUIDANCE DOCUMENT FOR AN APPLICATION FOR RAPID INFILTRATION BASINS

Rapid Infiltration Basins (RIB) allow land treatment and disposal of wastewater. Applied wastewater percolates through the soil and the treated effluent drains via hydraulic pathways to groundwater or surface water. Information from the items listed below shall be present in an application for a RIB. The Bureau of Water Pollution Control reserves the right to require further site characterization and additional design criteria. As a minimum, an application for RIBs shall include the following:

1. Complete physical and chemical characterization of the fluid to be infiltrated;
2. Characterization of the site to completely define topography, soil classification to 10 feet below the bottom of the RIB, lithology (physical and chemical) of the vadose zone, stratigraphic analysis of the vadose zone, aquifer quality and gradient, field observations of vegetation changes and distance to nearest seeps or surface waters;
3. Borehole logs with standard description. The depth should be to the water surface of the main aquifer or a maximum of 150 feet;
4. Infiltration and permeability tests results. The soils shall be tested at the bottom of the basin, five feet below the bottom of the basin and 10 feet below the bottom of the basin. If stratigraphic data shows discontinuous layering, then tests shall be performed at multiple sites. The tests shall be conducted in-situ or on 'undisturbed' samples. If the fluid to be infiltrated is high in solids, then an appropriate high solids fluid shall be used to conduct these tests. Evidence of why excessive percolate mounding will not occur below the RIB shall be presented. Percolate mounding shall be considered excessive if it remains within 10 feet of the basin bottom during the drying cycle;
5. Design criteria and calculations of hydraulic loading rate and required basin area;
6. The dry-cycle time required for RIB recovery and the wet/dry cycle ratio;
7. Design of physical elements like dikes, access ramps, inlet structures, outlet structures, flow control devices and permanent depth measuring devices;
8. Documentation of degree of treatment if the RIB is used as a process component for treatment; and
9. An Operations and Maintenance manual, written for the operator, that covers as a minimum scheduling, proper application of wet/dry cycling, monitoring, reporting and winter operations.

The minimum design criteria for RIBs prohibits the following:

1. Basin bottom permeability to a depth of 12 inches less than 2.0 in/hr (1.4 cm/sec);
2. Depth to ground water, below the basin bottom, of less than 10 feet;
3. Fewer than two basins per site;
4. Depth to an impermeable layer, below the basin bottom, of less than 30 feet.
An impermeable layer, is defined as a strata of 3 inches or greater thickness homogeneously occurring beneath the area of interest and with a minimum permeability of 0.014 in/hr (1.0×10^{-5} cm/sec);
5. Lack of information on depth and quality of groundwater or a rationale justifying why depth and quality are not obtainable;
6. A distance of less than 1000 feet (305 m) from a water supply well or a surface water;
7. Lack of at least three monitoring wells. One up-gradient and two down-gradient of the RIB. The down-gradient monitoring wells shall be in the most probable pathway of the plume. Exploratory boreholes, if penetrating to the saturated zone, may be converted to monitoring wells;
8. Total depth of basin of less than 4 feet;
9. Inadequate area for wet/dry cycling; and
10. Inadequate fencing and posting of signs. If the RIB is used for wastewater disposal, a sign is required every 500 feet minimum. If the length of the fence is less than 500 feet, then a sign is required on each side of the fence.

The Bureau strongly recommends use of the references listed below. The references should be consulted from preliminary site selection to final design.

REFERENCES:

USEPA, "Process Design Manual for Land Treatment of Municipal Wastewater", No. 625/1-81-031a

USEPA, "Supplement on Rapid Infiltration and Overland Flow",